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THE ABBEY OF JUMIÈGES.

RUINS OF THE ABBEY OF JUMIÈGES.

On entering the mouth of the Seine with the rising tide, and following the capricious windings of that river, many interesting objects appeal to the notice of the antiquarian traveller. Harfleur is soon recognised by its high steeple, built by the English, "the monument at once of their reign and of their defeat," as it is now regarded by the French historians; then Quillebœuf-point, to which a sad celebrity is attached, on account of the numerous shipwrecks which it has witnessed; then we see Caudebec and its little port, where a few solitary fishing-boats are reposing. We then perceive on the left bank of the river two towers, (one of which is very ruinous,) thrown out in clear relief upon the blue sky. During the day, these towers serve as a landmark to vessels, being discovered at a great distance; and towards the close of a fine day, when the air is pure and transparent, they seem to be two white phantoms standing on the shore. Isolated as they are, at the extremity of one of the islets formed by the sinuous course of the Seine, these two towers, which from a distance would seem to announce your approach to some large city, are found desolate and alone, the abode merely of families of birds, whose shrill cries have superseded the sonorous tones of bells and the solemn chants of the church.

There was formerly in that spot a rich and celebrated abbey, whose origin may be traced back through ages to the early period of the French monarchy. Jumièges, so long the abode of the austere and learned monk, had already become celebrated in the time of the first successors of Clovis. Tradition

says, that in the year 640, in the reign of Dagobert, St. Philibert and a few other cenobites* chose, at five leagues from Rouen (a very small borough at this distant period), the islet of Jumièges for their retreat. They built a monastery there, which in following ages was gradually enlarged and embellished. By degrees it became an abbey of the Benedictines, and all the wondrous resources of Gothic architecture were lavished upon this establishment. There were added gradually to Jumièges those elegant columns, those light and bold arches, and those wondrous specimens of sculpture, whose very ruins at the present day excite so much admiration. Stone was made to assume the most graceful forms: it was carved into lacework, cut out into statues of the saints with incredible delicacy, and into arabesques, in which was displayed a richness of imagination which might seem to belong to fairy-land. Thus was Jumièges enlarged and adorned by masons, the meanest of whom seems to have been an accomplished artist; and yet scarcely one of the authors of so many wonders has left behind him a name. How rich in the arts must have been these middle ages, (*dark ages*, as they are sometimes called,) which thus scattered on all sides, as every-day work, so much magnificence and so many wonders!

Some years after the founding of Jumièges, when the poor and humble monastery had no other fame than that which arose to it from the holiness of its inmates, Philibert, the founder and first abbot of Jumièges, accompanied by one of his monks, was walking on the banks of the Seine, blessing God for the peace which He had given to his servants in that holy seclusion during a time of cruel war and devastation, when suddenly he perceived, at a distance, a vessel without sail or oars floating at hazard on the river, and carried about by the winds and waves.

As this boat came on with the current, Philibert could perceive that it had not been abandoned by the fisherman as a prey to the storm, as he at first imagined. A man was in the boat, and he allowed himself to be borne along the stream, without making any effort to direct his course. At length the little vessel was carried by the waves to the place where the abbot stood; and what was the astonishment of Philibert, when he saw two young persons extended on rich cushions at the bottom of this frail skiff: they were weak and pale; their arms were bound up with linen which was still bloody. The man who was sitting up in the boat said to the abbot, "These are the two sons of our master, Clovis the Second, *unnerved* by order of the king their father:" and such indeed was the case. To punish his sons for the crime of rebellion, the king had caused them to be *unnerved;* that is to say, he had had the nerves of their arms severed, so as to make it impossible for them ever after to handle a sword; and this punishment was equivalent to being set aside from inheriting the throne; for in these warlike times, the prince was little more than a captain whose peculiar privilege it was, to move at the head of his army into the battle-field. The nobles of the kingdom, who at first demanded the death of the young princes, were with difficulty appeased by this sentence. The two unhappy youths were cast into a boat without sails or oars: provisions were given them, and a man to wait on them, and thus they were abandoned to their fate, and left to the mercy of Him who rules the winds and waves. From that little borough, which is now become the splendid city of Paris, down to the place where Philibert received them, they had thus been floating along with the course of the river.

* Those who have their possessions *in common*.

By means of the care and attention of the good cenobite, the two young princes were soon cured of their wounds. Some time afterwards they assumed the monkish habit, resolving to live and die in this friendly solitude. Clovis the Second being apprized of this event, and feeling grateful for the protection afforded to those who had been the victims of a cruel sentence, came to Jumièges, accompanied by his queen Bathilde. He saw and embraced his children once more, and richly endowed the abbey which was henceforward to serve them as a retreat.

Many centuries have passed away since that time; many princes, many noble lords have visited Jumièges, before and since the time of Charles the Seventh, who came to rest from the toils of war near the simple and modest dwelling of Agnes Sorel; the ruins of which are still seen at a short distance from the abbey. Many abbots have succeeded St. Philibert in his office; the neighbouring population have often come to assist in the sacred duties performed beneath the bold arches of that church, brought thither by the renown of superior sanctity which the convent had enjoyed. But now Jumièges is wasted and desolate. Revolutions, rather than ages, have despoiled this magnificent structure. The roof has covered with its ruins the bases of columns, which have no longer anything to support. The modern "Goths" have thrown into a lime-kiln, or sold to antiquarian collectors, the greater part of those wonders of sculpture and masterpieces of art, which formerly decorated Jumièges. Birds alone people these ruins; grass grows in the spacious halls, and in the church. Nothing remains but solitude, desolation, and the two high towers; which would doubtless have been thrown down also, for the sale of their stones, if they did not serve as guides to the mariners in ascending the river; but, if you should visit Jumièges, in the midst of all this desolation, not far from the monument where Agnes Sorel's heart was deposited, they will still show you half hidden by briars and rubbish, the tomb of the two ENERVÉS.

THE *bodily* eye is capable of perceiving *natural* objects, and of thereby conveying to the mind a continual accession of ideas; but how could it perform this office unless there were *light* to render these objects visible? The *mental* eye, in like manner, is capable of discerning *spiritual* truths; but to what purpose would it possess this faculty, unless these truths were rendered discernible, by a sufficiency of light to bring them to its view; and whence can that light issue, but from the source of spiritual illumination? In both cases, the natural objects and the spiritual truths have, indeed, their existence, independently of our perception of them; but except so far as the natural light in the one case, and the light of revelation in the other, is cast upon them, they are to us as if they did not exist. As well, therefore, might we affirm that the eye can see in darkness, as that reason can discover spiritual truths without the light of *revelation*.——VAN MILDERT.

THROUGH groves sequestered, dark, and still,
Low vales and mossy cells among,
In silent paths the careless rill
With languid murmur steals along:
Awhile it plays with circling sweep,
And lingering, leaves its native plain;
Then pours impetuous down the steep,
And mingles with the boundless main.
Oh! let my years thus devious glide,
Through silent scenes obscurely calm,
Nor wealth, nor strife, pollute the tide,
Nor honour's sanguinary palm:
When labour tires and pleasure palls,
Still let the stream untroubled be;
As down the steep of age it falls,
And mingles with Eternity!—HAWKESWORTH.

ON THE CUSTOM OF WEARING RINGS.

I. Finger-Rings.

The wearing of rings upon the fingers is a custom which has prevailed among nearly all the most distinguished nations of the world, from the earliest days of history to our own times. The origin of the practice is, in fact, shrouded in the darkness of antiquity; but, whenever it arose, and wherever entertained, it implied a title, or presumption, on the part of the wearer, to honour and respect.

Like most of the primeval tokens of the vanity of mankind, the custom certainly arose in the East, and spread itself over the world with the increasing numbers of the human race. In ancient Egypt, the kingdom of the Pharaohs, the use of seals existed at least 1700 years B.C. When Joseph was advanced to the dignity of chief governor under Pharaoh, he received from the monarch his ring, as a token of the authority with which he was invested over the people of Egypt. In the kingdom of Persia, we find in the Book of Esther, that the monarch, Ahasuerus, when he raised his favourite Haman to authority and power, gave him his ring; as likewise he did afterwards to Mordecai. In the beautiful parable of the Prodigal Son, we find that one of the marks of his restoration to his home and family, and the favour of his sire, is that the latter commands his servants to "put a ring on his hand." The Apostle St. James, likewise, when reproving the early Christians for their faults, blames them for showing undue respect to those who were rich—for instance, "a man with a gold ring."

We read likewise in the Book of Numbers, c. xxxi. v. 50, that, when the Israelites had conquered the Midianites, who dwelt at the southern part of Palestine, they offered to the Lord among other things the rings which they had taken from the enemy. This circumstance shows, therefore, that in those early ages, the practice was very common. It was, probably, universal in Egypt, which was intimately connected, in very ancient times, with all the western part of the Asiatic continent. Indeed, rings are among the articles discovered by Belzoni and others, as the remnants of Egyptian antiquities in the chambers of the Pyramids.

When the ring was used as a mark of government or authority, for the purpose of sealing or authenticating public or private documents, it was termed a *signet*-ring, or signet; which occurs frequently in the Scriptures and in other writings: the seal being then, of course, worn on the hand, as is sometimes the case even in modern times. Sometimes, however, it was worn as a bracelet on the arm, a custom which still obtains in the East. Thus the bride in the Canticles, c. viii. v. 6, desires that her spouse would wear her as a *seal* on his arm.

We do not find much mention of the ring with reference to the countries properly comprehended under Ancient Greece; but, in the personal history of the Roman nation, the ring forms a very distinguishing ornament in the way of dress. They began to be common at Rome after the expulsion of the kings, though they were anciently in use among the Sabine part of the population of Italy. Gold always was, as it is now, the metal most chiefly used for making rings; but iron, lead, copper, and silver, were all first used by the lower order of people, gold being reserved for the senators and knights. The plebeians used sometimes rings gilt or plated; at other times, they were made of amber and ivory.

Iron rings were permitted to slaves who wished to gratify their taste for ornament. In the course of time, diamonds and other precious stones were fixed upon the rings; and the make of the rings was more tasteful and elegant. When slaves were enfranchised, they were allowed to wear rings of a more noble metal than iron: so that the change of the ring was an outward and visible sign of elevation in the social state. At one time of the Roman republic, the distinction of rings for the several orders of the state, was strictly preserved. At the battle of Cannæ, Hannibal collected several bushels of gold rings, belonging to the conquered Romans, thus showing that, though the *gold* ring was once confined to the senators, its use had become general in the army. Though the slaves could not presume to wear gold rings, yet they ventured to wear iron ornaments of this sort, richly gilt.

Soon after the erection of the Roman state into an empire, gold rings were worn almost universally, except by slaves. In order, therefore, to bring back the dignity of the ring to something like its former state, a law was passed, under the sanction of Tiberius Cæsar, to restrict the wearing of the gold ring to persons whose immediate ancestors were possessed of property to a certain amount: but, in the time of Justinian, all who had not been slaves, were permitted, by an universal decree, to enjoy the pleasure or honour of wearing the gold ring.

The Romans, who seem to have distinguished themselves above all other people in the wearing of rings, became at length so delicate and fastidious, that each person commonly had two rings, one thick and heavy for the winter, and a lighter one for the summer. By moderate people one ring was worn on the middle finger. In the course of time the number of rings worn by each individual was increased: three rings on one hand soon became common, and soon after, one on each finger. One man, we are told, wore *sixteen* on his hand. At one time they used the right-hand, at another time the left, then all the fingers in turn; at last the fingers of the *left*-hand were entirely covered with jewelled rings, it being found that the right-hand was inconvenient for the purpose.

The face of an ancestor, of a friend, or of the reigning emperor, was sometimes sculptured on the rings, and at other times some public event, such as a victory, or a triumph: such a ring was commonly employed in the sealing of letters. Under the sculpture of the stone was often concealed a deadly poison, that the wearer of the ring might, by this suicidal method, free himself from the frowns of fortune. This sad and dreadful alternative was chiefly had recourse to under despotic rulers, and in the declining ages of the Roman empire. The cases of Demosthenes and Hannibal are well known.

When a person was dying, the ring was taken from his finger. If the dying person delivered it to any one, it betokened the adoption of the person to whom it was delivered, as heir to him who gave it. Sometimes the dying parent delivered it to the eldest son, in token of the dominion of the latter over the family estate. The birth-day ring was only worn on that day, and was a present from friends.

The ornaments of the ancient Britons, like those of the Gauls, consisted in part of rings, made of gold and silver, and in default of these metals, of brass. They were exceedingly fond of these ornaments, and had them of iron, when nothing better was at hand. On opening some of the barrows or burying-places of the ancient Britons, which are so numerously scattered over the downs of South Wiltshire, Sir Richard Colt Hoare found numerous rings and female ornaments, so elegant and so rich as to make it evident that the ancient Britons were not so barbarous as we generally imagine; for they must have had a foreign

commerce to enrich them, especially with gold; so that they either imported expensive works of art from abroad, or paid for the production of them at home.

The antiquity of the marriage-ring is, in all probability, very great. It was a pledge of an engagement solemnly contracted, and of never-ending unity and affection. Its use as a pledge was at one time more regarded than its value as an ornament, therefore it was made of *iron*. In the course of time, the iron gave way to gold; but women were still not in the habit of wearing rings in the early times of the Christian Church, except such as their suitors sent them. The nuns of the order of St Anne, at Rome, show a rude silver ring as the wedding-ring of Joachim and Anna, the parents of the Virgin Mary.

We cannot conclude this part of our subject without noticing an ancient form of the marriage-ring, termed the *gimmal* ring. The origin of the word "gimmal" is to be referred, perhaps, to the Latin *gemellus, twin* or *double*, and implies the *unity* of heart which should belong to the married *pair*. The ring is constructed, therefore, of double hoops, which play one within another, like the links of a chain. Each hoop has one of its sides flat, the other conxex; each is twisted once round, and each is surmounted by a hand, issuing from an embossed fancy-work wrist or sleeve, the hand rising somewhat above the circle, and extending in the same direction. The course of the twist in each hoop is made to correspond with that of its counterpart; so that, on bringing together the flat surfaces of the hoops, the latter immediately unite in one ring. On the lower hand, or that of which the palm is uppermost, is represented a heart; and, as the hoops close, the hands slide into contact, forming, with their ornamented wrists, a head to the whole. The device thus presents a triple emblem of love, fidelity, and union. Such a ring as this was found at Horsleydown, and exhibited in the year 1800, before the Society of Antiquaries.

When the gimmal-ring was used as the ring of affiance, the lover putting his finger through one of the hoops, and his mistress her's through the other, were thus, symbolically, yoked together; a yoke which neither could be said *wholly* to wear, one half being allotted to the other. In this use of the gimmal may be seen typified, "a community of interests, mutual forbearance, and a participation of authority."

There is a superstition common in the west of England, among ignorant people, that a person subject to fits may be cured by wearing a ring made of the lead of a coffin which has remained a certain number of years in the vault. The writer has frequently had occasion to employ a poor man, subject to fits, who wore upon his fingers as many as seven or eight rings of the above description. He declared his entire belief in the efficacy of the remedy, the successful operation of which he had witnessed in cases similar to his own; and he feared that the reason why he himself was not cured was because he had not got the proper description of lead, or that it was not taken from the coffin at the proper time.

O SACRED *Solitude*, divine retreat;
Choice of the prudent, envy of the great;
By thy pure stream, or in thy waving shade,
We court fair Wisdom, that celestial maid:
The genuine offspring of her loved embrace,
Strangers on earth, are innocence and peace.
There, from the ways of men laid safe ashore,
We smile to hear the distant tempest roar;
There blest with health, with business unperplexed,
This life we relish, and ensure the next.—YOUNG.

THE ORDER OF KNIGHTS OF THE BATH.

II.

IN a former article on this subject, we briefly sketched the history of the order to the beginning of the present century, and described the ceremony of investiture. On the 19th of May, 1803, an installation of twenty-two knights, attended by sixty esquires, was held.

When George the First revived the order, he appointed Henry the Seventh's chapel for the performance of the ceremony of installation: and accordingly, on the occasion to which we allude, all the requisite preparations were made in the chapel.

The knights-elect, dressed in their surcoats, mantles, and spurs, assembled in the Prince's chamber at Westminster, at ten o'clock in the forenoon; where the knights companions, in their full orders, met them at half-past ten. They then, with the dean at their head, went in procession from the Prince's chamber, to the south-east door of Westminster abbey, along a platform wide enough to admit six persons abreast. This platform was lined with guards, outside of whom were immense throngs of spectators. The Duke of York, as Grand Master of the Order of the Bath, walked last in the procession. A band of trumpets and drums played the air, "Britons strike home."

The procession entered the abbey in the following order:—

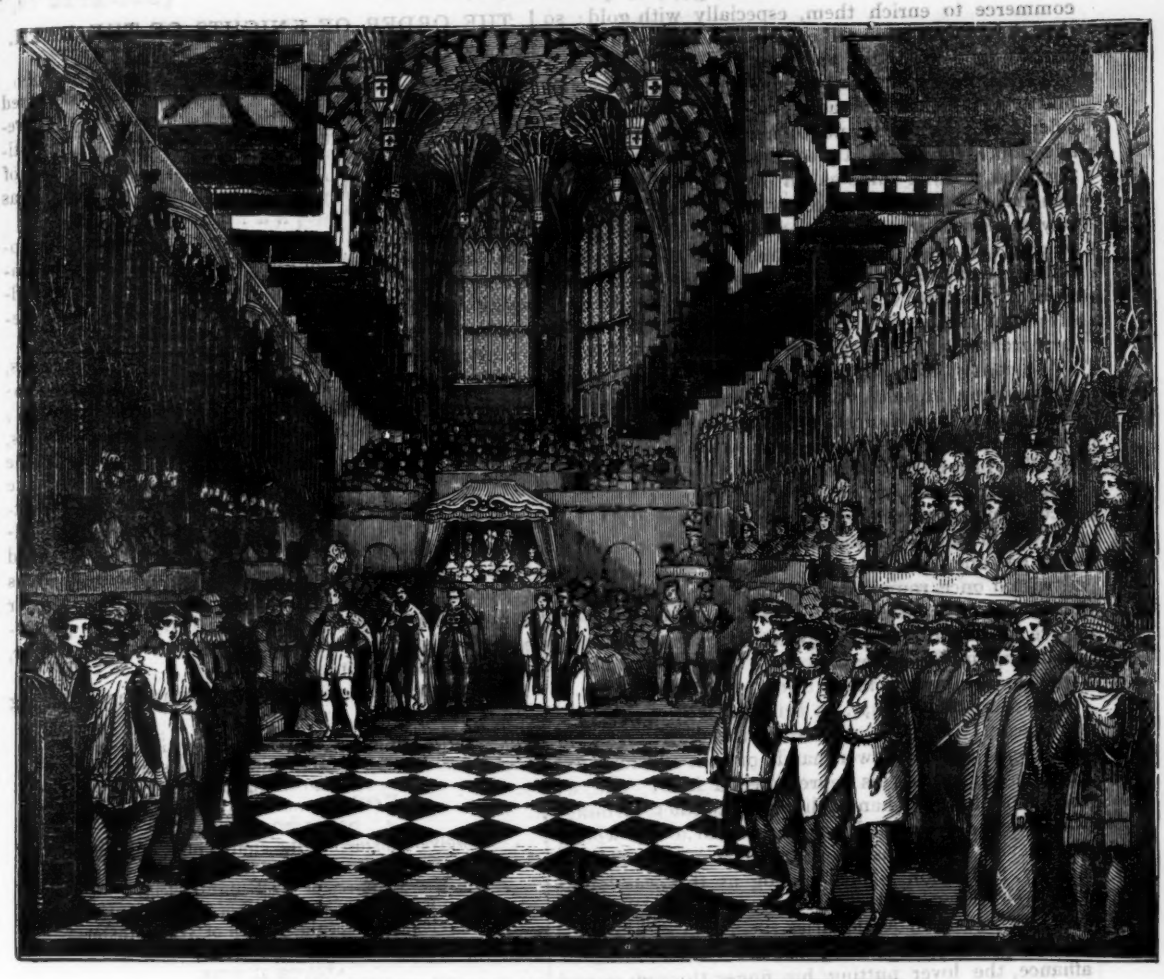
Six gentlemen in dark crimson silk scarfs.
Drums of His Majesty's household.
Drum major.
Kettle drums and trumpets.
Serjeant trumpeter.
Twelve almsmen of the church of Westminster.
Messenger of the Order.
Esquires of the Knights-elect.
Esquires of the Knights Companions.
Prebendaries of the church of Westminster.
The Sub-dean.
Officers at arms.
The Knights-elect.
Officers of the Order.
Dean of the Order.
Duke of York, as Grand Master.
Twelve Yeomen.

The procession passed down to the end of the south aisle, where were seated the Queen, the Princess of Wales, the Princesses Augusta, Elizabeth, Mary, Sophia, and Amelia, and the Duke of Cumberland, in a box lined with crimson velvet. The knights halted, and paid their obedience to the royal visitors; and then proceeded onward to Henry the Seventh's chapel; where, all being entered, the doors were closed, and no one admitted as a spectator of the installation.

All the various officers then made a double reverence:—*i. e.*, first to the altar, and then to the tomb of Henry the Seventh, and passed on to the places assigned to them. All the knights, both elect and companions, stationed themselves under their respective banners. The King at Arms then bowed to the Duke of York and all the knights companions, who thereupon ascended their stalls, and sat down covered.

The next ceremony was to bury under the altar, the banners of the knights companions, who had died since the last preceding installation. The two junior knights companions received from the King at Arms, the banner of the senior deceased knight, and carried it towards the altar, where they placed it into the hands of the prebendaries. The same ceremony was performed with the banners of all the other deceased knights.

This singular kind of burial of the honours of



INSTALLATION OF KNIGHTS OF THE BATH, IN WESTMINSTER ABBEY.

deceased knights, being ended, the new knights were next installed, one at a time, in the following manner: the senior knight-elect came forward to the middle of the choir, made his reverences, and ascended his stall, where he stood with his hat and feather in his hand. The book of the statutes and the great collar of the order, were then brought on a cushion to the middle of the choir. The Duke of York descended from his stall, and, attended by the dean, proceeded to the stall of the knight-elect. The Duke then took the book of the statutes, and delivered it to the knight-elect, to whom the dean administered an oath. The Duke as Grand Master, then took the collar, and invested the knight with it: lastly, he placed the hat and feather on the head of the knight, and caused him to take his seat,—which constituted the act of installation. The remaining knights-elect, were installed in a similar manner.

Divine service was then performed, consisting of a Te Deum, and several anthems, performed by the organist and choir, the knights being uncovered. When the service was ended, the knights put on their hats and feathers, descended from their stalls, made their reverences in the middle of the choir, and retired under their respective banners. The Grand Master, and all the other knights in succession, then proceeded to the altar, on which they laid oblations of gold and silver. After which, all the knights proceeded again to the altar, according to seniority, drew their swords, and handed them to the dean, who laid the swords on the altar, and afterwards returned them to the knights. The knights, after being conducted back to their banners, remained there during the performance of the coronation anthem, which concluded the ceremony.

The procession then returned to the Prince's chamber, in the House of Lords, in nearly the same order as before.

On the procession arriving at the door in Poet's corner, the King's cook, dressed in full court dress, bowed to each knight, and addressed him thus:—"Sir knight, the great oath that you have taken, if you keep, it will be great honour to you; but if you break it, I have power, by virtue of my office, to hack the spurs from off your heels." Each of the knights bowed to him and touched his hat. Some of them asked him if there were any fees to pay? to which he answered, he would do himself the honour to call on them. Four guineas is said to be the fee for this extraordinary speech.

Among the knights installed on this occasion, were Lord Nelson, Lord Whitworth, Lord Keith, Sir Joseph Banks, Lord Henley, Admiral Saumarez, Admiral Duckworth, &c. Of the twenty-two knights, eleven were at the time abroad; so their places were supplied by proxy.

It will be seen, from these details, and from our wood-cut illustration, that the installation of Knights of the Bath, was a very splendid ceremony. Indeed, with the exception of the coronation, there are few which have exceeded it in magnificence.

All the information which we have given, in this and the former article, respecting the nature of this order, must be considered as applying before the

year 1815, since great changes were made at that time.

After the momentous wars, in which England had been engaged from 1790 to 1815, the Prince Regent was desirous of distinguishing, by some honorary title, those officers who had deserved well of their country during the war; and he therefore, made such changes in the constitution of the Order of the Bath, as should allow of a great increase of its numbers. He therefore ordained that the order should consist of three classes, differing from one another in rank and dignity, viz., Knights Grand Crosses, Knights Commanders, and Companions.

The first class, were to be on a level with the Knights Commanders previously made. They were, with the exception of princes of the blood royal, not to exceed seventy-two in number; of whom, a number not exceeding twelve, might be nominated in consideration of services rendered in civil and diplomatic employments; but the remainder were to be officers in the army or navy. The officers then newly created into this class, were to bear upon the ensign or star, and likewise upon the badge of the order, the addition of a wreath of laurel encircling the motto, and issuing from an escroll inscribed "*Ich dien**." The lowest rank in the army to which admission to this class was to be awarded, was fixed at major-general, and in the navy, rear-admiral.

Of the second class, the number, in the first instance, was not to exceed one hundred and eighty, exclusive of foreign officers holding British commissions, of whom, a number not exceeding ten, may be admitted into this class as honorary knights commanders; but, under particular circumstances, the number composing this class may be increased. The officers chosen into this class, must be holding a commission at the time; and at the period when these changes were made, a lieutenant-colonelcy in the army, or a post-command in the navy, was the lowest rank admissible into the class; but, by a subsequent arrangement, no officers under a major-general, or a rear-admiral, are admitted. Each knight commander to wear his appropriate badge or cognizance pendent by a red riband round the neck, and his appropriate star embroidered on the left side of his upper vestment. For the greater honour of this class, it was further ordained, that no officer of His Majesty's army or navy, was thenceforward to be nominated to the dignity of a knight grand cross, who had not been appointed previously, a knight commander.

The third class, or Companions, was to be composed of officers holding commissions in His Majesty's service, by sea or land; not to be entitled to the appellation, style, or precedence, of knights bachelors; but to take precedence of all esquires of the United Kingdom. No officer to be nominated a companion of the order unless he shall previously have received a medal, or other badge of honour, or shall have been specially mentioned, by name, in despatches published in the *London Gazette*, as having distinguished himself.

Shortly afterwards, the second and third classes of the order were placed open to the reception of a certain number of officers, in the service of the East India Company, as a testimony of the value which was placed upon their services.

It will be obvious, that since the order is so completely remodelled, and so greatly extended, the splendid scene of an installation, cannot reasonably be expected to be repeated, on a scale of magnificence such as we have attempted to describe.

* Signifying in the German language, "I serve."

THE WATER-LILIES OF THE NILE.

WHEN the Nile is at its height (says Herodotus) and the fields are covered with its waters, there appears on the surface a vast quantity of lilies, which the Egyptians call *lotus*; these they gather and dry in the sun, carefully preserving the seed. This seed resembles that of the poppy, and is found in the middle of the lotus; they bruise it and make bread of it. They also eat the root of this plant, which has a sweet and pleasant taste; it is round, and about the size of an apple.

Indeed, from the time that the Nile begins to overflow its banks, and to spread over the adjacent country, until the return of its waters to their natural channel, the surface of canals, rivers, and of almost all the inundated soil, is enamelled with flowers. Their splendid corollas, some white and others azure, delight the senses by their soft perfume, and beautiful appearance. These flowers are those of two sorts of water-lily, (*Nymphæa,*) which are peculiar to Egypt. The first, which Linnæus calls *Nymphæa lotus*, has long been celebrated by historians and poets; and all travellers both ancient and modern have bestowed on it their tribute of praise and admiration. Its root consists of a bundle of very long white fleshy filaments, the upper ends of which proceed from roundish tubercles. These tubercles are the part of the root which Herodotus speaks of as affording food to the people, but the flavour is not such as he describes it to be: on the contrary we find it dry, earthy, and insipid. The leaves of this plant are large, numerous, and divided into two lobes from their base up to the place where the leafstalk is inserted, that is to say, to the middle of the disk; they are not so thick as those of our water-lilies of Europe, of a deep green colour, the upper surface shining, the under one often clouded with violet or purple. These leaves are borne by cylindrical stalks which spring from the root, and are of considerable length, floating on the surface of the water.

The flowers are of a very large size, often measuring more than four inches in diameter; the flower-stalks also rise from the root and bear each one blossom. The calyx or flower-cup is composed of eight leaflets, disposed in two rows and coloured within; those of the innermost row are the most deeply coloured, and somewhat resemble the petals. The petals are from twelve to twenty in number, and equally disposed in many rows. They are oval shaped, lanceolate, and very unequal; those of the last row being much smaller than the others; their colour is pure milk white; sometimes, but not ordinarily, tinged with purple. The stamens are yellow, with wide petal-shaped filaments.

The second kind of water-lily common to Egypt, and which has been termed on account of its blue colour *Nymphæa cærulea*, does not appear to have been much noticed by travellers, though it always grows by the side of the *Nymphæa lotus* and seems to take pleasure in mingling its blossoms with those of that beautiful plant. The difference in the growth and form of these lilies is not considerable: their fruit is likewise the same: in both species it is a dry round grain divided into many cells which contain a quantity of small rose-coloured seeds. The odour which is exhaled by this azure lily is extremely delicate and sweet; that of the lotus is more powerful but much less pleasing.

We have two sorts of water-lily common in England; the white and the yellow; our white lily (*Nymphæa alba*), which opens its petals at about seven in the morning, and closes them at about four, reposes on the surface of our slow-running rivers and brooks in almost Oriental magnificence. Many of the British

water-plants are extremely beautiful; but there are none more to be admired than the white and the yellow water-lilies. The latter of these is chiefly found in lakes or pools.

Some of the plants which float on our rivulets or adorn their banks are thus noticed by Mrs. Charlotte Smith.

Sheltering the coot's or wild duck's nest
And where the timid halcyon hides,
The Willow-herb in crimson dressed
Waves with Arundo o'er the tides;
And these the bright Nymphæa loves to lave,
Or spread her golden orbs upon the dimpling wave.

THE CIRCULATION OF THE BLOOD.

That the blood passes from the heart to the several parts of the body was discovered about 1620, by Harvey. The heart is a powerful muscle, which, by its action, contracting and dilating, sends forward the blood with extraordinary speed to all the extremities of the body. The vessels which receive it from the heart, and convey it to its destination, are called arteries; if one of these be opened, the blood spouts from it in jets caused by the several contractions of the heart. You may feel the blood bounding along by placing your finger on a pulse; wherever there is a pulse, there is an artery. You may perceive a pulse in the wrist, in the neck, in the temple, and under the lower jaw.

The arteries which are nearest to the heart are very large; as they are more distant they divide into branches, so that altogether they would appear like trees, with a great trunk and small branches. After the arteries have carried the blood to the feet, the hands, the head, the whole surface and substance of the body, the business of the veins is to bring it back again. They receive it from the arteries and convey it to the heart; and, being small at the extremities, they unite their streams like rivers, and finally flow back to the heart in a large and copious current. They have very curious valves, or internal flaps or caps, which allow the blood to come from the extremities towards the heart, but should any circumstance incline the blood to go back to the extremities, the valves close like doors, and prevent it. Sometimes these valves are out of order, and the veins then can scarcely perform their office. The blood which returns from the feet to the heart has a long way to travel, and the valves prevent the blood in the higher parts of the veins from pressing on the lower part, but if the valves cannot close, these veins in the leg suffer by it, and swell, and sometimes burst.

You may perceive by this account that there is a continual exchange of blood that fills the heart; it is no sooner emptied into the arteries than it is filled again from the veins, and this contraction and dilatation succeed each other with great rapidity. It is supposed that the quantity of blood contained in the body amounts to between twenty-five and thirty-five pounds, and that about two ounces pass on from the heart at each pulsation. Hence the whole quantity of blood will pass through the circulation in three or four minutes. Dr. Hunter dissected a whale, and he related that the aorta, which is the principal artery of the body, measured a foot in diameter, and that ten or fifteen gallons of blood are thrown out of the heart at a stroke.

The lungs are very largely supplied with blood-vessels, of which some appear to be destined for the nourishment of the lungs, but by far the principal part convey the blood from the right side of the heart, in order that it may, after minute division and diffusion over the air-cells, be exposed to the influence of the external air, drawn in by breathing, and be carried back to the heart in a proper state for nourishing the body. The blood which passes from the heart into the lungs is of a dark red colour; after circulating through the lungs, it becomes of a florid red, and is then in a state fit for nutrition. It has been supposed by men learned in these subjects, that part of the oxygen which exists in the air is absorbed by the blood in the act of breathing, and gives it this florid red colour.

If you would convince a person of his mistake, accost him not upon that subject when his spirit is ruffled or discomposed with any occurrences of life; and especially when he has heated his passions in the defence of a contrary opinion. Watts.

PHILOSOPHY OF A SOAP-BUBBLE.

IV.

At the conclusion of the last paper*, we explained the manner in which the coloured stripes of the soap-bubble are formed in white light, and illustrated it, by supposing seven pieces of properly painted glass, to be superposed. This mode, however, would be practically impossible, owing to the imperfection of our artificial colours, the comparative opacity of coloured glass, and other causes. Seven pieces of glass, properly painted like the seven prismatic colours, and superposed, do not form white, but black; and, therefore, we could only expect a similar result with the pieces described in the last paper.

There is, however, another mode, probably well known to the reader, by which a colour approaching to white, is formed by the mixture of the seven simple colours. We mean, a painted circular card, which is made to revolve very quickly. In this case, by properly adjusting the quantity of each colour, *white* light is formed by the mixture, when rapidly revolved. It now only remains to explain, how the alternately light and dark rings, spoken of before, are formed by homogenous light; and the colours of soap-bubbles and other thin plates, will then be entirely explained. For this purpose, we must enter a little into the two principal theories of the nature of light.

Newtonian Theory. Newton supposed light to be a species of matter, consisting of exceedingly small, imponderable, or *weightless*, corpuscles, or little bodies, projected by the sun into space, in all directions, and moving with a velocity of about 192,000 of English miles in a second of time.

Now to account for the phenomena of thin plates, he supposed that every *corpuscle*, or atom of light, as it moves through space, is subject to alternate *fits*, called *fits of easy reflection* and *transmission*. If a particle of light reach a surface during a fit of reflection, it will easily yield to the reflecting force of that surface, and be reflected. But, if it be in a fit of transmission, it will overcome that force which tries to make it bound off, and will pass on, or be transmitted.

Now, let a beam of light, consisting of rays all of one kind and colour, meet the first surface of a very thin plate of any transparent substance; all those rays which are in their fits of reflection, will be reflected, and so need not be taken into account: but those which are in a fit of transmission, will pass on into the plate; and after a short time will reach the second surface. Now, whether they are reflected back at this surface, or whether they pass on out of the plate, depends on the thickness of the plate. They must all have been in their fits of transmission when they entered the plate, or they could not have entered it at all. If, therefore, the thickness of the plate be *less than half the length of a fit*, they will still be in the same fit as when they entered, and will, therefore, be transmitted at this second surface; not a ray will be reflected: the plate will look black from above, but white from below. This accounts for all plates below a certain thickness presenting this appearance.

But, suppose the thickness of the plate to be as much, or nearly as much, as the length of a fit, then, all the rays which entered the first surface in a fit of transmission, will, during their passage through the plate, have changed their fit; and when they arrive at the second surface, they will be in a fit of reflection, and will all be reflected; and the film will look white, as in the first arch of the soap-bubble, or the innermost ring between the lenses. But, if the thickness of

* See *Saturday Magazine*, Vol. XV., p. 223

the film be a little more increased, then the ray will not reach the second surface till it has entirely passed through this fit of reflection, and begun another fit of transmission; so that then, the film will again appear black; for all the rays will be transmitted. In the same manner, it will be seen that if the thickness of of the plate be $\frac{1}{2}$, $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$ fits, it will transmit all the light, but if its thickness be equal to the length of 1, 2, 3, 4, or any whole number of fits, it will reflect all the rays and transmit none.

This applies, however, only to light of one colour. To account for the different breadths of the rings, when seen by different kinds of homogeneous light, Newton supposed the fits of red light were longer than those of violet light; and that the differences of colour and refrangibility in different kinds of rays, weresolely owing to the different lengths of their fits; red having the longest, and violet the shortest fits. Of course, this would occasion a difference in the thickness of plate required to reflect the different colours, thus accounting for the different breadths of the stripes of different colours, and also for the peculiar appearance presented when white light, or a mixture of all the colours, is used.

Newton even calculated the length of the fits of each kind of coloured light, which of course he could find, by measuring the thickness of his plate of air at different places; but how was this to be done, when its thickness was less than that of the thinnest gold leaf, of which 200,000 pieces would hardly be an inch in thickness? If the reader has some little knowledge of the beautiful science of mathematics, he will be prepared to understand the explanation of the manner, in which Newton measured these thicknesses in millionths of an inch*.

Newton determined the thickness of the black part of a soap-bubble to be only three-eighths of a millionth of an inch. This was one in addition to those similar, but more gigantic, calculations, by which he proved the earth, and other planets, to be moved by the same force, which made the apple fall from its native branch to the ground.

We will now give a slight idea of the mode by which these phenomena are accounted for by the present much more probable theory of light,—the *undulatory theory*.

According to this theory, light is not a peculiar substance or *kind* of matter, but only a peculiar *state* of matter; viz., a state of vibration like that which produces sound. The vibrations of sound are communicated through the air; but those of light through a far more rare and subtle fluid called *ether*, which is supposed to fill all space, and to be so extremely subtle as to penetrate not only between the particles of air, but also between those of solid substances, passing through glass as easily as water through a net. What is generally called a *perfect vacuum*, must therefore be only a space filled with this ether; for, of course, no vessel could be made which would confine or exclude it. The excessive thinness of this fluid accounts for its undulations being communicated with immense rapidity. It is supposed that every source of light sets this ether into a vibrating or wavering state; as a vibrating string acts on the air, or a stone on the water into which it is thrown.

Now it is known that, if two tides, or sets of waves, meet each other, the result is sometimes a very high tide, but sometimes no tide at all. If the two sets of waves meet in such a way, that all the elevations or waves correspond, and all the depressions or troughs also correspond, the result is a doubly high tide, as might be expected. This is the case in many harbours where the tide comes in by two passages of equal length. But suppose the two passages to be rather unequal in length, so that one tide arrives a little later than the other, the difference may be such, that all the elevations of one set of waves correspond with the depressions of the other, and *vice versâ*. Then the two tides destroy each other, and render the surface of the water comparatively smooth.

The same thing occurs in sound; sometimes *double sound produces silence*. When two notes slightly differing from each other in pitch, are sounded together, the two sets of waves meet as above, and sometimes destroy each other. Thus, the two notes instead of uniting and producing a louder sound, produce that periodical interval of silence which the musician calls a *beat*.

According to the undulatory theory, the same occurs with light. Sometimes *double light produces darkness*. When two portions of light arrive at the same spot by travelling two different routes, if the two routes slightly differ in length, the two sets of ethereal undulations may so meet as to destroy each other, as the two tides do in some harbours; and such is the case in those very thin films which appear black. The light falling on them follows two different routes, in order to come to the eye. Some light is reflected back from the first surface, and the rest penetrates into the film and is reflected from the second surface; and this last portion evidently travels to the eye by a route rather longer than that of the former portion. Now, if the thickness of the plate be equal to half the length of a wave of light, or to the length of $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$, &c. waves, the two sets of undulations coming from the two surfaces of the film, and meeting in the eye, destroy each other, and produce darkness, or a black colour. This is the case in all the black stripes, which appear on a thin film seen in homogeneous light. But, at all the light stripes, the thickness of the plate is 1, 2, 3, 4, or some whole number of light waves; and at such places, the two portions of light from the two surfaces, on uniting in the eye, produce a doubly luminous effect.

As in the Newtonian theory of light, the fits are of different lengths in the different colours, so, in this theory, different colours in light are like the different notes in musical sounds: they are both due to a difference in the length or slowness of the vibrations; in the one case of ether, in the other of air. *Brilliancy* of light corresponds with *loudness* of sound; but *colour* corresponds with *pitch*. Some persons are inclined to doubt the accounts of the rapidity of the vibrations requisite to produce *sound*; the very lowest sound being due to at least twelve vibrations in a second of time, while the highest notes require 3000 or 4000 vibrations in a second! But what will such persons say to the velocity of the vibrations which constitute *light*; when it is calculated, on unerring principles, that to produce red light, which corresponds to a low sound, there is required about 458 billions* of vibrations in a single second; while violet, or the light which corresponds to a shrill sound, is due to 727 billions of vibrations in a second of time! This difference in the length of the waves of the different colours, accounts for the different breadths of the stripes seen on a film in different *coloured* lights; and for the different coloured stripes seen in *white* light, as explained at the end of the last paper.

* A billion is a million of millions.

* See TOMLINSON'S *Manual of Natural Philosophy*, p. 538.

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